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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/690,835	10/21/2003	Subbareddy Kanagasabapathy	52069	5411

21874 7590 01/18/2005

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EXAMINER	
LEE, SIN J	

ART UNIT	PAPER NUMBER
1752	

DATE MAILED: 01/18/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/690,835	KANAGASABAPATHY ET AL.	
	Examiner	Art Unit	
	Sin J. Lee	1752	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 October 2004*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *21-40* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *21-40* is/are rejected.

7)☒ Claim(s) *35* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

1. Applicants canceled claims 1-20.

Claim Objections

2. Claim 35 is objected to under 37 CFR 1.75 as being a substantial duplicate of claim 34. When two claims in an application are duplicates or else are so close in content that they both cover the same thing, despite a slight difference in wording, it is proper after allowing one claim to object to the other as being a substantial duplicate of the allowed claim. See MPEP § 706.03(k).

3. Due to newly cited prior arts and new grounds of rejections, previously indicated allowability of previous claims 10, 15, and 16 are hereby withdrawn. Due to the new grounds of rejections, the following rejections are made *non-final*.

Claim Rejections - 35 USC § 102

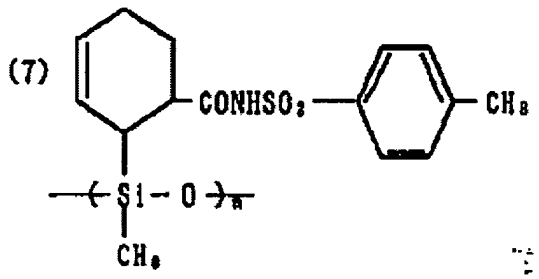
4. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

5. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

6. Claims 25-28, 30, and 39 are rejected under 35 U.S.C. 102(b) as being anticipated by Aoso et al (JP 06-059458 and its machine-assisted English translation provided by Japan Patent Office).

Aoso teaches (see abstract of the English translation) a negative photosensitive composition containing a polysiloxane compound and a photosensitive azido compound (a photoactive component). As one of the example for the polysiloxane compound, Aoso teaches (see [0045] of the English translation) the following;



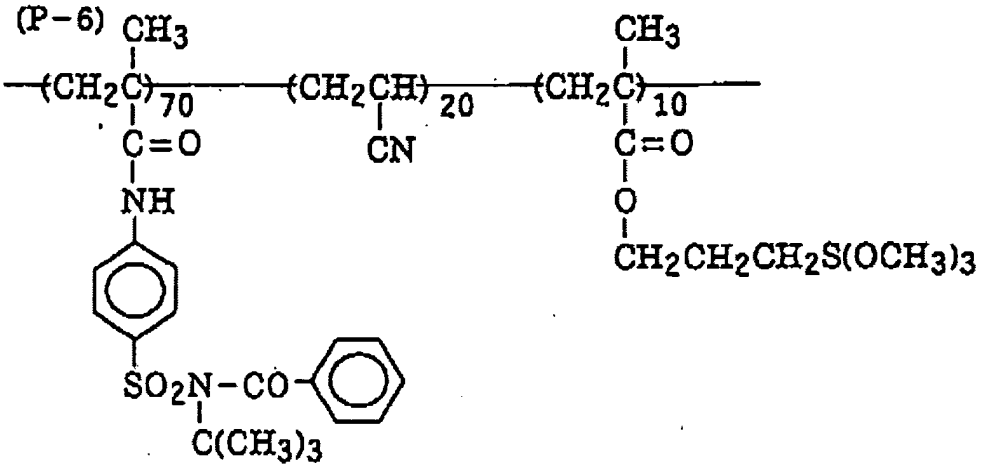
Therefore, Aoso teaches present inventions of claims 25-28.

Aoso teaches ([0075]) that an alkali-soluble polymer can be added to his photosensitive composition, and as one of several *preferable* examples, Aoso teaches (see [0076]) a polymer having N-sulfonyl amide group. Since there are only several preferred examples given for the alkali-soluble polymer, one of ordinary skill in the art would immediately envisage using the polymer having N-sulfonyl amide group as the alkali-soluble polymer in Aoso's photosensitive composition. Therefore, Aoso teaches present invention of claim 30.

In [0117]-[0119], Aoso teaches applying his photosensitive composition onto a silicon wafer (to which a novolak resin was applied as a lower layer), exposing and developing the resist film. Therefore, Aoso teaches present invention of claim 39.

7. Claims 32-36 and 40 are rejected under 35 U.S.C. 102(b) as being anticipated by Kawamura et al (EP 0 814 381 A1).

Kawamura teaches a positive image forming composition, which comprises a photoacid generator and a polymer having the moiety of $-SO_2-NR_3-CO-$ (see abstract). As one of the specific example for the polymer, Kawamura teaches following polymer (P-6) (see pg.22, lines 6-7, pg.23, lines 25-40);



(*it is the Examiner's position that the "S" in the third repeating unit shown above is a typographical error and is meant to be "Si"* – see polymer (P-4) and pg.19, line 1). The polymer shown above also comprises t-butyl group as well as trimethoxysilyl group (both of which are acid-labile groups). Therefore, Kawamura teaches present inventions of claims 32-36. Kawamura also teaches (see pg.33, lines 56-58) papers laminated with polyethylene, polypropylene, or polystyrene as one of the examples for the support material to which his photosensitive composition is applied. After his photosensitive composition is coated onto the support, the photosensitive layer is exposed to a light source and then developed (see pg.34, liens 19-20, lines 44-46, lines 55-58, pg.35, lines 1-6). Therefore, Kawamura teaches present invention of claim 40.

8. Claims 25-29, 31, 32, 34-37, 39, and 40 are rejected under 35 U.S.C. 102(e) as being anticipated by Barclay et al (US 2003/0235785 A1)

The applied reference has a common inventor with the instant application. Based upon the earlier effective U.S. filing date of the reference, it constitutes prior art under 35 U.S.C. 102(e). This rejection under 35 U.S.C. 102(e) might be overcome either by a showing under 37 CFR 1.132 that any invention disclosed but not claimed in the reference was derived from the inventor of this application and is thus not the invention "by another," or by an appropriate showing under 37 CFR 1.131.

Barclay teaches a negative acting photoresist composition containing a photoactive component and a resin component (see [0012]-[0013]). As one of the preferred resin, Barclay teaches ([0048]) Si polymers formed from polymerization of R-Si(halide)$_3$ in which the R group represents *alkyl* or *alicyclic* groups (*both of which are non-aromatic*) and may be substituted by an aqueous base-solubilizing groups such as a fluorinated alcohol, *sulfonamide*, thiol, or the like. Based on this teaching, one of ordinary skill in the art would immediately envisage Si polymers formed from polymerization of R-Si(halide)$_3$ in which R group is substituted by sulfonamide groups. Barclay also teaches ([0049]) that the Si polymer can contain two or three or more distinct repeat units. Therefore, the prior art teaches present inventions of claims 25-27, 29, 32, 34, 35, and 37.

Barclay also teaches ([0013]) that his resist composition can comprise a separate crosslinker component. Therefore, the prior art teaches present invention of claim 31.

With respect to present claims 28 and 36, Barclay states ([0052]) that although polymers of his invention are preferably used for short wavelengths such as 193 nm and 157 nm, the polymers can also be used with 248 nm and that for such higher wavelength application, the polymer may suitable contain aromatic units. Therefore, Barclay teaches present inventions of claims 28 and 36.

Barclay teaches ([0081] and [0086]-[0088]) that his photoresist containing the Si-polymer is applied as a top layer onto a bottom layer of novolac polymer based resist (the bottom layer being coated on a substrate). Following coating of the photoresist, it is imaged through a mask and then developed. Therefore, the prior art teaches present inventions of claims 39 and 40.

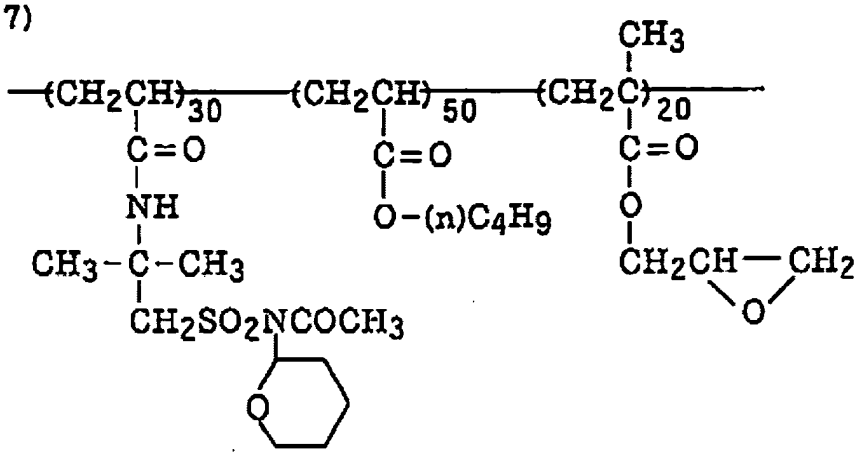
Claim Rejections - 35 USC § 103

9. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

10. Claims 32-35, 37, and 40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura et al (EP 0 814 381 A1).

As discussed above in Paragraph 7, Kawamura teaches a positive image forming composition, which comprises a photoacid generator and a polymer having the moiety of $-SO_2-NR_3-CO-$ (see abstract). As one of the specific example for the polymer, Kawamura teaches following polymer (P-7) (see pg.22, lines 6-7, pg.23, lines 40-55);

(P-7)

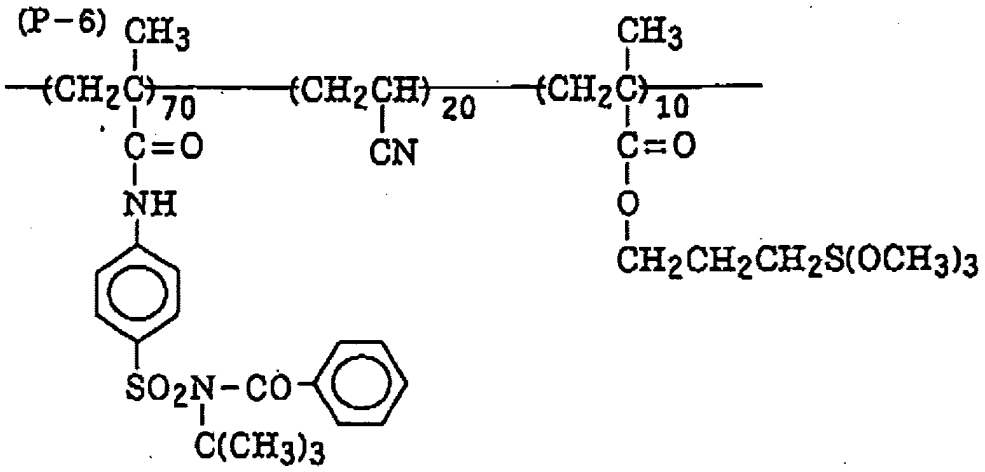


Furthermore, Kawamura teaches (pg.18, lines 52-54, pg.19, line 1) the equivalence of the monomer unit of butyl acrylate (which is the second repeating unit shown above) and the monomer unit of methacryloyloxypropyltrimethoxysilane as comonomers that can be copolymerized with the N-sulfonylamide monomer (the first repeating unit shown above). Therefore, the prior art teaches the equivalence of those two monomer units, it would have been obvious to one of ordinary skill in the art to replace the second monomer unit shown above with the monomer unit of methacryloyloxypropyltrimethoxysilane with a reasonable expectation of obtaining a positive image forming composition which is reduced in the resist pattern change depending on the standing period from the exposure till the heat treatment. Therefore, Kawamura's teaching would render obvious present inventions of claims 32-35 and 37. As discussed above in Paragraph 5, Kawamura also teaches (see pg.33, lines 56-58) papers laminated with polyethylene, polypropylene, or polystyrene as one of the examples for the support material to which his photosensitive composition is applied. After his photosensitive composition is coated onto the support, the photosensitive layer

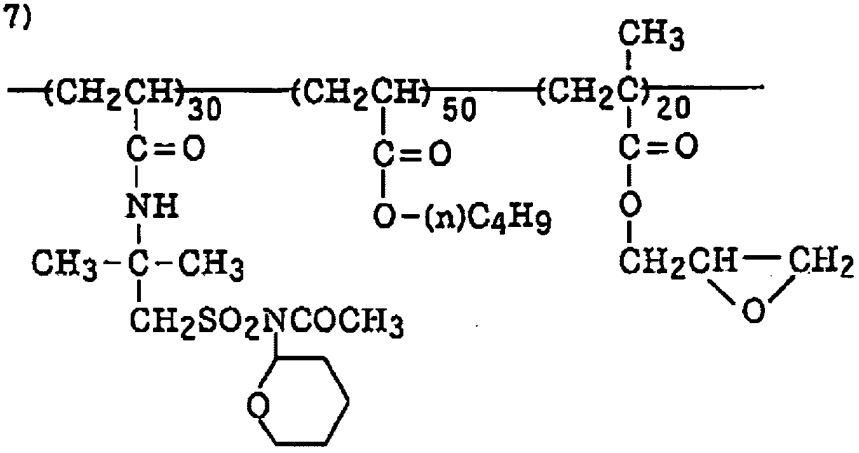
is exposed to a light source and then developed (see pg.34, liens 19-20, lines 44-46, lines 55-58, pg.35, lines 1-6). Therefore, Kawamura's teaching would render obvious present invention of claim 40.

11. Claims 21-24 and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawamura et al (EP 0 814 381 A1).

Kawamura teaches a positive image forming composition, which comprises a photoacid generator and a polymer having the moiety of $-SO_2-NR_3-CO-$ (see abstract). As specific examples for the polymer, Kawamura teaches following polymers (P-6) and (P-7) (see pg.22, lines 6-7, pg.23, lines 25-55);



(P-7)



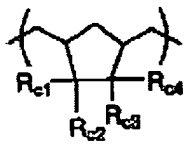
(*it is the Examiner's position that the "S" in the third repeating unit of (P-6) shown above is a typographical error and is meant to be "Si"* – see polymer (P-4) and pg.19, line 1). The polymers shown above comprise t-butyl group, trimethoxysilyl group, and tetrahydropyranyl group, all of which are acid-labile groups).

Kawamura also teaches (pg.33, lines 11-12) that his N-sulfonylamide compound (such as those polymers shown above) *can be used together with* conventional dissolution inhibitors, which are acid-cleavable substances. Kawamura teaches organic *polymers* containing C-O-*Si* linkages as one of examples for such dissolution inhibitors (see pg.33, lines 44-48). Based on Kawamura's teaching, it would have been obvious to one of ordinary skill in the art to use Kawamura's N-sulfonylamide group-containing polymer (such as (P-6) or (P-7)) together with a dissolution inhibitor such as an organic *polymer* containing C-O-*Si* linkages with a reasonable expectation of obtaining a positive image forming composition which is reduced in the resist pattern change depending on the standing period from the exposure till the heat treatment. Therefore, Kawamura's teaching would render obvious present inventions of claims 21-24.

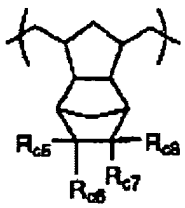
Kawamura also teaches (see pg.33, lines 56-58) papers laminated with polyethylene, polypropylene, or polystyrene as one of the examples for the support material to which his photosensitive composition is applied. After his photosensitive composition is coated onto the support, the photosensitive layer is exposed to a light source and then developed (see pg.34, liens 19-20, lines 44-46, lines 55-58, pg.35, lines 1-6). Therefore, Kawamura's teaching would render obvious present invention of claim 38.

12. Claims 21, 22, 24, and 38 are rejected under 35 U.S.C. 103(a) as being unpatentable over Mizutani (JP 2001-201855, its DERWENT English abstract, and its machine-assisted English translation provided by Japan Patent Office).

Mizutani teaches (see DERWENT abstract and claim 1 of the machine English translation) a composition comprising an acid-generating compound and a acid-decomposable resin which has a repeat unit selected from the following formulae (C1) and (C2);

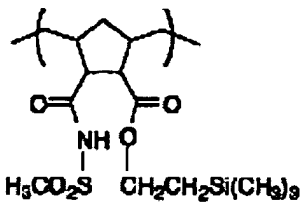
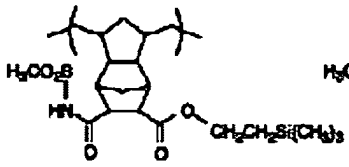
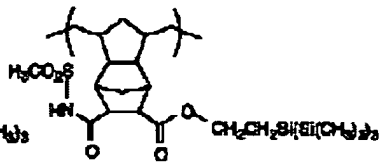


(C1)



(C2)

As examples for the repeat unit of the formula (C1) and (C2), Mizutani includes the following repeat units (see [0079]-[0083]);

Therefore, Mizutani teaches present polymer that comprises sulfonamide group.

Mizutani also teaches (see [0107]) that is desirable to add a surfactant to his photoresist composition in order to have little development defect, and as one of example for such surfactant, Mizutani teaches *polysiloxane polymer* (as a silicon system surfactant). Based on Mizutani's teaching, it would have been obvious to add a surfactant such as polysiloxane polymer to Mizutani's photoresist composition in order to reduce development defects. Therefore, Mizutani's teaching would render obvious present inventions of claims 21, 22 (those repeating units shown above all have trimethylsilyl group (an acid-labile group)), and 24.

With respect to present claim 38, Mizutani teaches (see [0111] and [0113]) that after his photoresist composition is applied on a substrate, the resist film is exposed and then developed to obtain a resist pattern. Mizutani furthermore teaches that a lower layer of organic polymer membrane can be used under the upper resist layer made of his inventive composition to form a two-layer resist. Therefore, Mizutani's teaching would render obvious present invention of claim 38.

Double Patenting

13. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225

USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970);and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321(c) may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

14. Claims 25-27, 29, 31, and 39 are provisionally rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1, 8, 15, 17, 18, and 20 of copending Application No. 10/382,090. Although the conflicting claims are not identical, they are not patentably distinct from each other because of the following reasons:

Claim 1 of App.'090 states the following;

> 1. A method for providing a negative-tone photoresist relief image, comprising:
>
> a) applying on a substrate a coating layer of a photoresist composition that comprises a photoactive component and a resin that comprises units that provide 1) aqueous alkaline solubility, and 2) contrast between exposed and unexposed coating layer regions upon development with an aqueous alkaline composition;
>
> b) exposing the photoresist coating layer to radiation having a wavelength of less than 200 nm; and
>
> c) developing the exposed coating layer with an aqueous alkaline composition to provide a negative tone photoresist image on the substrate.

Claim 8 of App.'090 furthermore states that the resin of claim 1 comprise a sulfonamide group and claim 17 states that the photoresist of claim 1 comprises a Si resin. Therefore, App.'090 renders obvious present inventions of claims 25-27. Claim 20 of App.'090 states that the resin of claim 1 is substantially free of aromatic groups.

Therefore, App.'090 renders obvious present invention of claim 29. Claim 15 of App.'090 states that the photoresist of claim 1 further comprises a crosslinker component. Therefore, App.'090 renders obvious present invention of claim 31. Claim 18 of App.'090 teaches that the photoresist of claim 1 is overcoated on an underlayer organic composition. Therefore, App.'090 renders obvious present invention of claim 39.

This is a provisional obviousness-type double patenting rejection because the conflicting claims have not in fact been patented.

15. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Sin J. Lee whose telephone number is 571-272-1333. The examiner can normally be reached on Monday-Friday from 9:00 am EST to 5:30 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cynthia Kelly, can be reached on 571-272-1526. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free).

S. Lee
January 17, 2005

Sin J. Lee
Patent Examiner
Technology Center 1700